Lessard, Edward T

From: Petricek, Robert J
Sent: Tuesday, September 20, 2005 4:09 PM
To: Lessard, Edward T; Glenn, Joseph W; Gmur, Nicholas; Kane, Steven F; Mortazavi, Payman; Sidi-Yekhlef, Ahmed; Wu, Kuo-Chen; Ganetis, George; Rakowsky, George; Tanabe, Toshiya; Harder, David A; Lehecka, Michael; Wanderer, Peter; Durnan, James T; Skaritka, John; Chouhan, Shailendra; Ribaudo, Paul
Cc: Travis, Richard J; Alforque, Rodulfo; Kroon, Peter J; Rehak, Margareta L
Subject: Minutes of SCU Magnet Vertical Test Apparatus Walk Through

Follow Up Flag: Follow up
Flag Status: Blue

Attachments: LESHC_0502_MinutesSigned.doc; Lead Design; P&ID; Some responses to action items.

All,
As a follow-up to LESHC 05-02 (Minutes attached), a meeting was held on Friday September 9th in the Annex of Building 902 to inspect the SCU Magnet Vertical Test Apparatus as it is being assembled and prepared for phase I testing.

The attendees were: Nick Gmur, John Skaritka, George Rakowsky, Toshiya Tanabe, Dave Harder, Shailendra Chouhan and Mike Lefecka of NSLS; Paul Ribaudo and Peter Wanderer of AM; Jim Durnan of HP; and Ed Lessard, Steve Kane and Robert Petricek for the LESHC Cryogenic Safety Subcommittee.

John Skaritka of NSLS reviewed with those present the physical layout of the equipment, design parameters and discussed operations of the equipment for phase I testing. He handed out to committee members P&ID drawing of the SCU Vertical Test Facility.

Also attached is John Skaritka's email (received on September 16th) which responds to some of the below listed action items. Included in the email and as separate attachments are the design drawing of the lead cooling apparatus from American Magnetics Inc. and the P&ID for the SCU Vertical Test Facility.

The following points were raised during the meeting:

- Steve Kane raised a question as to the operating pressure for phase I testing. If the pressure for testing is greater then 15 psi then the boiler codes must be met. Since the pressure for phase II is above 15 psi the requirement of the Boiler Codes must be met for phase II testing.

ACTION: John Skaritka will verify maximum operating pressure of phase I testing and report back to the committee. If maximum operating pressure of phase I testing is greater then 15 psi provide documentation to the committee to show equipment meets the requirements of the boiler codes

- Relief value settings and certification were discussed. John indicated that the relief valves would be set between 3 and 5 psi. Valves are to be submitted to Jim Durnan for certification.

ACTION: Michael Lehecka will work with Jim Duran to have the relief valves certified. Submit documentation to Robert Petricek for committee's records.

- Steve Kane questioned where the burst disc would relieve to and if operating personnel would be adequately protected. All of the relief valves and burst discs were faced upward to help protect personnel near the test apparatus. However it was pointed out that this would not adequately protect personnel that may be working on the scaffolding during operation.

ACTION: Extend all relief valves and burst discs exhausts such that the discharge points are at least 8 feet above the personnel work surface.

- Steve Kane questioned if the committee had reviewed the design of the lead cooling apparatus. Since the minutes of the committee meeting do not reflect this review a review should be completed.

ACTION: John Skaritka will submit to Steve Kane and to the committee design documentation of the lead cooling apparatus for distribution and review.

- Steve Kane asked if there was a fill procedure for the lead cooling apparatus. The test procedure only had a re-fill procedure.

ACTION: John Skaritka will submit to the Robert Petricek for distribution to the committee an updated copy of the test procedure including the fill procedure for the lead cooling apparatus.
Action: Steve Kane will review the operating procedure and P&ID and provide comments to John Skaritka.

- Ed Lessard asked if the testing would be conducted with or without personnel present to monitoring the operation. John Skaritka responded that it would be monitored 100% of the time by trained personnel.
- Discussion was held on the lifting of the test device and whether the top hat would be a below the hook lifting device. For phase I testing two lifts would be required. One to place the device into the Sampson Dewar and one to take it out.

ACTION: John Skaritka to review the lift in accordance with the SBMS Lifting Safety Subject area and submit the required documentation for approval.

- Ed Lessard has requested that a walk through be conducted of the SCU Magnet Vertical Test Apparatus once it has been assembled and is ready for testing.

ACTION: John Skaritka to arrange a tour of the SCU Magnet Vertical Test Apparatus once it has been assembled.

- Discussion was held as to the maximum power level of the test and what controls were in place or could be setup to prevent exceeding Phase I testing power levels. John stated that the maximum power level of the test would be 150-amps. Dave Harder said that it would be possible to install a 150-amp limit on the test equipment.

ACTION: Dave Harder to provide documentation that a 150-amp limit has been installed on the test equipment.

- Ed Lessard asked if the electrical equipment was NRTL certified or if it had been reviewed by the Local Authority Having Jurisdiction. Dave Harder responded that he was the Electrical Equipment Inspector (EEI) and that he had reviewed the equipment and all electrical equipment was found to be acceptable.
- Ed Lessard asked if a ESR had been prepared. No ESR had been prepared at this point but one would be generated.

ACTION: George Rakowsky is to prepare an ESR **for the phase I testing and submit it to the committee for review.**

- Discussion was held as to the calibration of the pressures gauges and having them traceable to NIST standards.

ACTION: Michael Lehecka will work with Jim Duran to provide documentation showing that the test apparatus pressure gauges have been properly calibrated and documented.




LESHC_0502_ utesSigned.doc

SKV11360-2-R 3.pdf (99 KB)

VTFcryodiagra T-MOD.pdf (21

Some ses to action it

Thanks!

Bob Petricek, MCSE
Chemical Management System Manager
Brookhaven National Laboratory
Building 120
petricek@bnl.gov
Phone 631-344-2028
Fax 631-344-8136

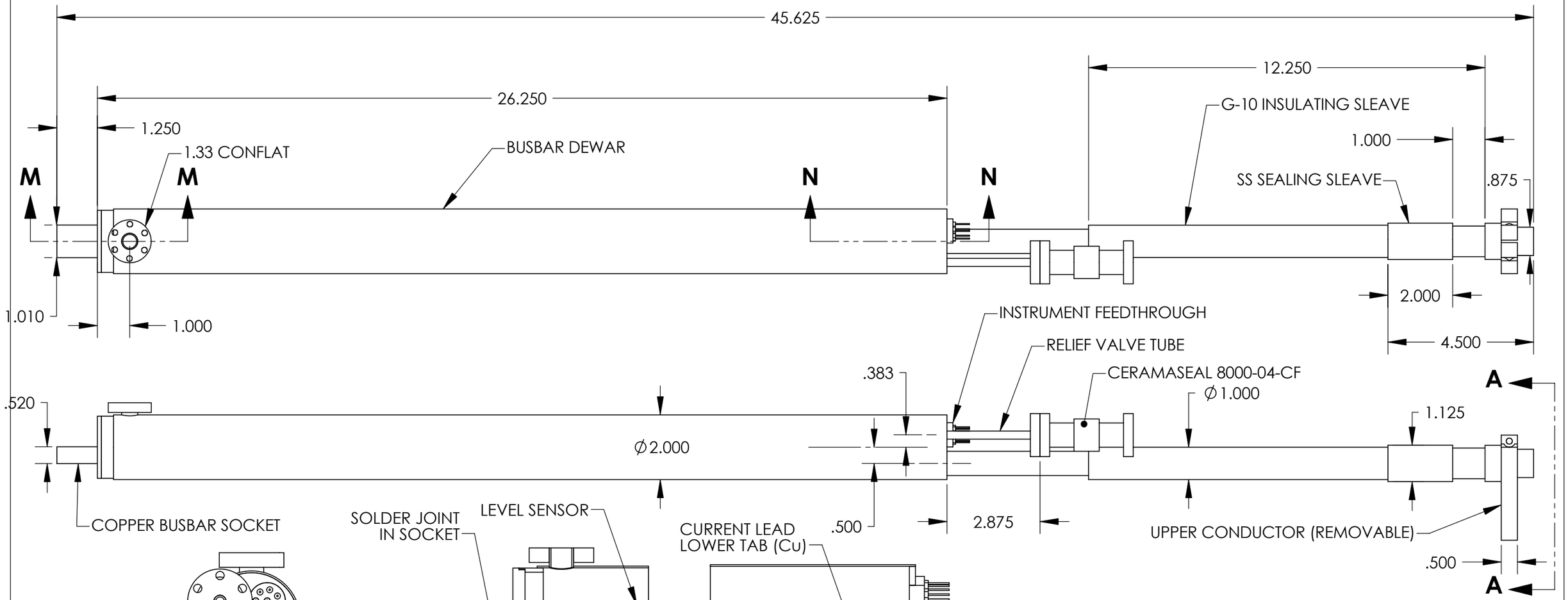
Lessard, Edward T

From: Skaritka, John
Sent: Friday, September 16, 2005 3:44 PM
To: Travis, Richard J; Petricek, Robert J; Lessard, Edward T; Kane, Steven F; Durnan, James T
Cc: Tanabe, Toshiya; Rakowsky, George; Harder, David A; Lehecka, Michael
Subject: Some responses to action items.
Attachments: SKV11360-2-R3.pdf; VTFcryodiagram5T-MOD.pdf

Gentlemen,
Attached are two responses to you actions.
The first is a drawing from American Magnetics showing some of the requested information.
We have repeatedly requested additional information concerning the detailed Lead design but company will not give us any additional information.
They are stating the leads are 1000 amp capacity with about a 3 Lt /hour per pair boil off rate at full current. They designed properly so the gas exiting the lead will be near ambient temperature when run at the design current and further detailed information we are requesting is proprietary.
The Engineer who designed these leads is Greg Laughon at American Magnetics their No. is 865-482-1056.
The second attachment is the P&ID in a .pdf format.

Work is proceeding on the setup for the testing of the relief valves, the installation of piping that will direct the exhaust from any relief device 8 ft above the elevated platform and the other Items from your list. I will be on travel until next Thursday If there any further requests until then please contact George Rakowsky or Toshiya Tanabe.

Thank you.
John Skaritka



TOLERANCES
UNLESS OTHERWISE SPECIFIED

FRACTIONS ± 1/64
XX DECIMALS ± 0.01
XXX DECIMALS ± 0.005
ANGLES ± 0°-30'
BREAK SHARP EDGES 1/64 MAX
SURFACE FINISH = 125 RMS

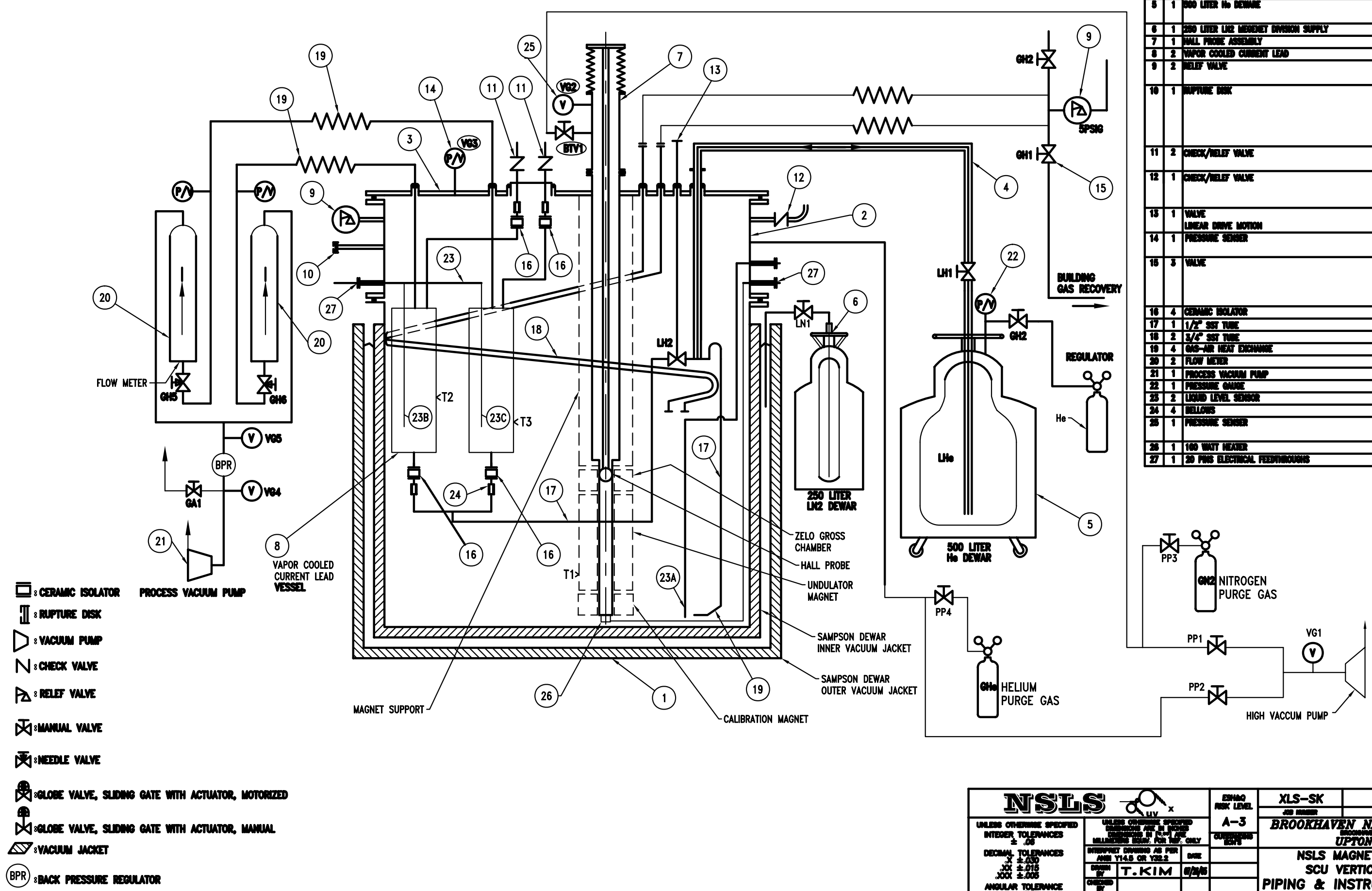
UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE IN
INCHES

AMERICAN MAGNETICS INC.

DESCRIPTION
BNL
1000 VCCL
W/INTEGRAL DEWAR

DATE:	DRAWN BY:	REVIEWED BY:	APPROVED:
7/23/03	GJL		

SCALE	SIZE	DRAWING NO.	SHEET	REV.
1:3	B	SKV11360-2	1 OF 1	3



ITEM	QTY	DESCRIPTION	MATL - PART NO	MANUFACTURER
1	1	SAMPSON TEST DEWARS		
2	1	SPOOL		
3	1	TOP HAT		
4	1	TRANSFER LINE	SERIAL#2794 MODEL#FTH.DRA	JANIS
5	1	500 LITER He DEWARE	SERIAL#1457 MODEL#DMSH250	CRYOFAB, INC.
6	1	250 LITER LN2 MEGENET DIVISION SUPPLY		
7	1	HALL PROBE ASSEMBLY		BNL
8	2	VAPOR COOLED CURRENT LEAD	L-1000	AMERICAN MAGNETICS
9	2	RELIEF VALVE	710E-BBEA-006	SPENCE CRYOGENIC SAFTY RELIEF VALVE
10	1	RUPTURE DISK	BS&B, 1"LPS316, 15P300072, 10K MFG, ASME BS&B, SRB-7RS, 1.0", 150NC, 316/316	BS&B safety system, LLC
11	2	CHECK/RELEF VALVE	SV05-082-SN5	CPC-CRYOLAB PRESSURE RELIEVING VACUUM SEAL
12	1	CHECK/RELEF VALVE	PRS-812-5-W5	CPC-CRYOLAB TYPE PRS-812 PRSSURE RELIEF DISK ASSEMBLY
13	1	VALVE LINEAR DRIVE MOTION	660004	NUPRO MDC
14	1	PRESSURE SENSER	MODEL# KJL-912023 0605	Kurt j. Lesker co
15	3	VALVE	E346-086-TF6	CPC-CRYOLAB MANUAL GLOBE VALVE FOR CRYOGENIC GAS SERVICE 1.0"FNPT PORTS
16	4	CERAMIC ISOLATOR	464000	MDC
17	1	1/2" SST TUBE		
18	2	3/4" SST TUBE		
19	4	GAS-AIR HEAT EXCHANGE		BNL
20	2	FLOW METER	LPM AIR, 0-100	COLE/PARMER
21	1	PROCESS VACUUM PUMP	1423-101Q-G626X	GAST
22	1	PRESSURE GAUGE		
23	2	LIQUID LEVEL SENSOR	B2-0207-12HJ	AMERICAN MAGNETICS
24	4	BELLOWS	470005	MDC
25	1	PRESSURE SENSER	MODEL# KJL-912037 0705	Kurt j. Lesker co
26	1	100 WATT HEATER	HTER-25-100	LAKE SHORE
27	1	20 PINS ELECTRICAL FEEDTHROUGHS	647000	MDC

REV.	ZONE	DESCRIPTION	BY	DATE	CKR	APP.

NSLS

UNLESS OTHERWISE SPECIFIED
INTEGER TOLERANCES ± .06
DECIMAL TOLERANCES .X ±.030 .XX ±.015 .XXX ±.005
ANGULAR TOLERANCE ± 0.5
UNSPECIFIED RADII .02 MAX.
125 FINISH BREAK SHARP CORNERS AND EDGES MAX. .03 MIN. .005

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES DIMENSIONS IN [0.00] ARE MILLIMETERS EQUIV. FOR REF. ONLY

INTERPRET DRAWING AS PER ANSI Y14.5 OR Y32.2 | DATE

DRAWN BY: T.KIM | 07/21/05
CHECKED BY:
VACUUM APPROVAL:
ENGINEER APPROVAL:
SUPVR. APPROVAL:

ESH&Q RISK LEVEL: A-3
CUSTOMERS IONS

XLS-SK (JOB NUMBER) | USED ON (USED ON DWG. NO.)

BROOKHAVEN NATIONAL LABORATORY
BROOKHAVEN SCIENCE ASSOCIATES
UPTON, N.Y. 11973

NSLS MAGNETIC MEASUREMENTS
SCU VERTICAL TEST FACILITY
PIPING & INSTRUMENTATION DIAGRAM

DIR\NUMBER | XLS-SK-474 -4 (DRAWING NUMBER) | A (REV.)
ACAD\DIR\NUMBER

COMPUTER REPRODUCIBLE | SCALE: — | SHEET 1 OF 1

From: Wu, Kuo-Chen
Sent: Monday, August 15, 2005 4:47 PM
To: Skaritka, John
Subject: FW: ODH for B905 (RE: MEETING TODAY! LESHC 05-02, SCU Testing, Take 2)

John,

You are right. Previous calculation is for ODH in B905.

For Annex, the building is smaller. It is about 100 x 80 ft. The area equals ~ 0.2 acre.

The height is greater than 30 ft. Building volume is estimated at 240,000 cubic foot.

For 500 Liter of liquid helium, the volume equals ~ 12,500 cubic foot.

To dump 500 L of liquid to Annex area. the O2 concentration will decrease from 20.5% to ~ 19.92%. There is no ODH concern for your experiment.

K. C.

-----Original Message-----
From: Wu, Kuo-Chen
Sent: Friday, January 21, 2005 10:03 AM
To: Travis, Richard J; Skaritka, John; Alforque, Rodulfo; Glenn, Joseph W; Kane, Steven F; Kroon, Peter J; Lessard, Edward T; Mortazavi, Payman; Rehak, Margareta L; Sidi-Yekhlef, Ahmed
Cc: Durnan, James T
Subject: ODH for B905 (RE: MEETING TODAY! LESHC 05-02, SCU Testing, Take 2)

Building 905 is a very large building. It is about 250 feet long and 100 feet wide. The floor area equals ~ 25,000 square foot, or 0.63 Acre. Yes, it is so large and can be described in terms of Acre. The height is greater than 30 feet. Building volume is at least 750,000 cubic foot.

For 500 Liter of liquid helium, the volume equals ~ 12,500 cubic foot.

To dump 500 L of liquid to B905, the O2 concentration is hardly fall below 20.5 % from 21%. Therefore, no ODH concern for the proposed experiment.

K. C. Wu

Prepared By: J. Skaritka,	Approved By: E. Haas	Approved By:

*Approval signatures on file with master copy.

1.0 INTRODUCTION

The primary objective of the phase I testing, being conducted, is to verify the operation of the SCU Vertical Test Apparatus (VTF), which was designed to survey the magnetic field of prototype superconducting insertion devices. The cold mass consists of a superconducting undulator and calibration magnet assembly. The piping and instrumentation diagram is depicted on drawing number XLS-SK-474-4.A. The superconducting undulator and calibration magnet assembly will be submerged in pool boiling liquid helium inside the 63 inch deep Sampson Test Dewar located in the 902 Annex building, Pretest preparation, cool down, hall probe field mapping and warm up shall be performed in accordance with this procedure.

2.0 SYSTEM DESCRIPTION FOR PHASE ONE TESTING

The phase one testing will involve pool boiling tests of a short section of undulator magnet about 17 cm long. The cold mass is approximately 4kg, it is affixed to the end of the VTF Top Hat assembly with a rigid frame composed of stainless steel threaded rods and aluminum plates. The cold mass is composed of the undulator, a calibration helmholtz coil assembly, an aluminum fixture plate that locates these components relative to each other, and one end of a frame composed of stainless steel threaded rods and aluminum plates rigidly locating the cold mass relative to the top hat and the magnet bore tube. The cold mass includes portions of a pair of vapor cooled current leads manufactured by the American Magnetics Company, an extruded aluminum Hall probe guide tube, and associated cryogenic plumbing and mounting hardware. See drawing number XLS-SK-474-4.A,

The Superconducting Undulator and Helmholtz calibration coil is wired in series and operated at approx. 160 amperes.

The top hat assembly will be inserted into the 63 inch deep Sampson dewar. A valved transfer line made by the Janis Co. will be used to transfer LHe between a 500 liter storage dewar and the test dewar.

Less then 70 liters of pool boiling liquid Helium will submerge the magnet assembly.

The stab extension line will run to the bottom of the dewar where filling will occur. The stab extension line has a valve that once opened can divert flow into a pair of 1000 ampere vapor cooled current leads. An oil-less vacuum pump will be used to supply a process vacuum to the exhaust ports of the gas cooled leads. A 250 liter dewar will supply liquid nitrogen to the outer shield to the Sampson dewar. Pressure and vacuum sensors shall monitor pressure in the supply and test dewar. A turbo Pumping station shall provide High vacuum for pumping and bottled He Gas shall provide initial purging.
. Mounted to the warm side of the Top Hat is the linear stage for the Hall probe. There is also a full electronics rack which houses the instrumentation to monitor liquid level, vacuum/pressure, and a ¼ rack for the motion control electronics.

3.0 VTF System Cool Down Procedure

The text of this procedure references the PI&D depicted on drawing number XLS-SK-474-4.A.

3.1 Pump and Purge Preparation

3.1.1 Trained NSLS staff shall pump and purge the inner probe guide tube with dry nitrogen gas to remove water vapor. This operation shall begin with valves PP1, PP2 , PP3 and PP4 closed and valve BTV1 open. Valve PP1 shall be opened and remain open until vacuum gauge VG1 indicates a vacuum of less then 1X10-3 torr. Valve PP1 shall then be closed. Gas pressure shall be set at 1-2 psig by the gaseous nitrogen purge gas supply regulator. Valve PP3 shall be opened and remain open until pressure as indicated on vacuum gauge VG2 reaches 1-2 psig. PP3 shall then be closed.
This Procedural Item shall be repeated at least 3 times. At the end of the last Pump purge cycle valve PP1 shall be opened and remain opened until the vacuum as indicated at VG2 is less then 1X10-3 Torr. Valve PP1 shall then be closed.

3.1.2 Trained Magnet Division cryogenic staff shall pump and purge the Sampson dewar a minimum of three cycles with gaseous helium to remove air and water vapor. This operation shall begin with all female bayonet ports at the top of the VTF plugged and valves GH1, GH2, GH5, GH6, PP1, PP2, PP3 and PP4 closed and LH2 open. Valve PP2 shall be opened and remain open until vacuum gauge VG1 indicates a vacuum of less then 1X10-3 torr. Valve PP2 shall then be closed. Gas pressure shall be set at 1-2 psig by the gaseous Helium purge gas supply regulator. Valve PP4 shall be opened and remain open until pressure as indicated on pressure/vacuum gauge VG3 reaches 1-2 psig. PP4 shall then be closed.
This Procedural Item shall be repeated at least 3 times. At the end of the last Pump purge cycle valve PP2 and GH1 shall be opened. Gas pressure shall be set at approximately 1 psig by the gaseous Helium purge gas supply regulator. GH1 shall be metered until pressure as indicated by VG3 is approximately 1 psig.

The exhausted helium purge gas shall be run into the building 902 spent gas recovery system.

3.2 Cryogenic System setup and cool down

Trained Magnet Division cryogenic staff shall perform the following tasks:

3.2.1 A standard commercial 500 liter liquid helium storage dewar shall be filled at the 902 refrigerator following procedures routinely performed in the past by qualified 902 cryogenic technicians and moved into position at the VTF located in the 902 Annex building.

3.2.2 The outer jacket of the Sampson test dewar will be filled with liquid nitrogen and the LN2 level shall be maintained throughout cool down and test operations following procedures routinely performed in the past by qualified 902 cryogenic technicians.

3.2.3 Open valve LH1 opened Install the Valved end of the Janis transfer line into the 500Lt helium dewar following procedures routinely performed in the past by qualified 902 cryogenic technicians. Insert valved line stab until the end of the

stab contacts the LHe surface and then retract the stab approximately ½ inch above the LHe level.

3.2.4 Establish a helium gas flow through the Janis transfer line adequate to establish a positive purge of Helium vapor but with out ice forming at the transfer line exit by opening valve GH2 and adjusting the 500lt helium dewar helium purge gas pressure regulator.

3.2.5 Remove the plug from the female bayonet of the VTF liquid Helium fill line. Observe a positive Helium gas purge emanating from the bayonet. Insert the end stab of the Janis transfer line into the female bayonet and seal.

3.3 Liquid Helium filling procedure

The following steps shall be performed by qualified 902 cryogenic technicians.

3.3.2 Open gaseous helium exhaust valve GH1 to release a positively purged GHe to the 902 recovery system.

3.3.3 Slowly insert the valved end of the Janis transfer line into the 500lt helium dewar to establish a Helium vapor flow through the VTF fill line.

3.3.4 Turn on vacuum pump item #21 to establish a process vacuum down stream from valves GH5 and GH6. Open needle valve GA1 until gage VG4 indicates -6 psig and the vacuum pump runs at a steady state temperature. Then adjust the Back pressure regulator until gauge VG5 indicates approximately -3 psig.

3.3.5 Slowly open valves GH5 and GH6 to establish a Helium gas flow rate of approximately 25Lt/min through each of the of the flow meters and shut off PP4

3.3.6. Monitor Temperature sensors in the magnet cold mass T1 and vapor cooled lead cans T2 and T3 adjust valves GH5, GH6 and GH1 so as to established an average cool down rate of approximately 5 degrees C per minute, until one of the liquid helium level probes item # 23 begins to indicate the presence of liquid helium.

3.3.7 Slowly close valve LH2 (liquid helium supply valve) to force Liquid Helium to fill the Sampson dewar. Meter LH2 to allow enough gaseous Helium into the vapor cooled current leads to maintain a positively purged condition so that the Lead can temperature does not rise significantly.

3.3.8 The test dewar will be filled until the magnet assembly is submerged and the liquid helium level has submerged the bottom of the current leads. This will occur when dewar liquid level sensor item #23a reaches a 95 percent level reading.

3.3.9 When the liquid level in the Sampson test dewar is stable, valve LH1 shall be metered to establish a relatively constant level in the test dewar.

3.4 Vapor Cooled Current Lead Re-Filled Procedure
During energized magnet testing a positive liquid level in the vapor current leads must be maintained. This required liquid helium level shall be between 10 percent and 90 percent. Note: A qualified cryogenic technician shall perform these tasks.

3.4.1 When the LHe level has been submerged the cold mass and constant level is established. Slowly open valve number LH2 to allow liquid helium to begin to be drawn from the Vessel reservoir the fill of the lead cans. Valve LH2 shall remain open until the readings from the liquid helium level sensors indicate that both vapor cooled current lead vessels have approximately a 90 percent level reading. Valve LH1 may be adjusted to compensate for the lead flow.

3.4.2 Valve LH2 shall be closed and liquid helium level sensors Item #23a/b shall be monitored.

3.4.3 The vapor cooled current lead liquid level sensors shall be monitored throughout the phase one testing. Adjust two needle valves GH5 and GH6 to maintain the liquid level of the lead vessels to minimize condensation around the gaseous feed-throughs at the top of the VTF top hat. A heat gun may be used to de-ice the feed lines.

3.4.4 When the liquid level in the vapor cooled current lead vessels reach approximately 10 percent valve LH2 shall be opened, this will allow liquid to be drawn into the current lead vessels from the reservoir supplied at the base of the Sampson dewar.

3.4.5 When the average liquid helium level in the vapor cooled lead vessels reach 90 percent valve LH2 shall be close.

3.4.6 This procedure Items 3.4.2 thru 3.4.5 shall be repeated as necessary to maintain adequate LHe level in the Vapor Cooled current Leads through out Undulator and Calibration magnet Survey.

4.0 Hall Probe Magnet Survey

4.1 After the Magnet cold mass has been submerged, the LHe level above the cold mass is relatively stable and an acceptable LHe level in the Vapor cooled current lead tanks have been established Magnet Survey may begin. NSLS staff shall perform all of the following procedures.

4.2 A 0.5 amp constant current source will supply current through the undulator and calibration magnet, and the voltage taps across each will be monitored to detect when the current path becomes superconducting.

4.3 When the undulator and calibration magnet are in the superconducting state the constant current source will be ramped to zero and switched out of the circuit.

4.4 The bipolar magnet power supply connected to the vapor cooled current leads will have its ramp rate set at 1 amp per second and its quench detection voltage set at ~1 volt. The magnet power supply will be turned on and the current will be ramped to -160 amps.

4.4 Field Survey of the Calibration and Undulator magnets

4.4.1 A partial Hall probe scan of only the calibration magnet will be made starting from the home position near the bottom of the dewar. Based upon that scan, the position of the magnetic peak of the calibration magnet will be determined.

4.4.2 The probe will then be moved to that position and the magnet supply current will slowly be varied over the range -100 amps to +100 amps in steps of 10 amps
. Hall readings will be taken at each current setting. Once that calibration data has been taken, the Hall probe will again be returned to the home position.

4.4.3 With the magnet supply current at +100 amps a full scan of the calibration magnet and the undulator will be done. The magnet supply current will then be ramped to zero and the supply will be turned off.

5.0 VTF System Warm-Up Procedure

The warm up process is not intended to recover LHe. The warm-up rate will be accomplished by natural heat conduction. The following steps will be followed.
Note: Only qualified cryogenic technicians shall perform these tasks.

5.1 Valve GH1 shall remain opened through out the warm up process and to direct gaseous helium boil off to the 902 Gas recovery system.

5.2 The valved end of the Janis transfer line that resides in the 500 Lt storage dewar shall be moved to a new position above the level of LHe in the dewar., The Liquid Helium Supply valve on the Janis transfer line LH1 shall then be closed.

5.3 Close valve LH2, Vapor cooled current lead LHe supply valve.

5.4 Close valve LN1, Liquid nitrogen supply valve to the Sampson dewar and disconnect the LN2 supply dewar.

5.5 Fully open valves GH5 and GH6

5.6 Turn off the process vacuum pump item#21 and open valve GH3
Note: Safety relief devices ensure no excess pressure buildup will be accumulated in the cryostat assembly.

5.7 The systems liquid level sensors item#23a,b,c and temperature sensors T1 and T2 shall be monitored.

5.8

5.9 When Liquid level sensors item # 23b and 23c both indicate Zero LHe level Valve LH2 shall be opened and valves GH5 and GH6 shall be closed.

5.10 When Liquid level sensors item # 23a indicates Zero LHe level in the lower half of the Sampson dewar open valve PP4 to establish a Gaseous Helium purge.

5.11 The output end of the Janis transfer line shall be removed from the VTF fill line and the bayonet plug shall be reinserted. The transfer line will then be removed from the 500Lt dewar and the dewar with its residual LHe shall be returned to the 902 refrigerator following procedures routinely performed in the past by qualified 902 cryogenic technicians. A heat gun shall be used to safely bring the ends of the Janis transfer line up to approximately room temperature.

5.12 Monitor Temperature sensors T1 and T2. then the minimum temperature in the dewar is above 100 degrees Kelvin valve PP4 shall be closed and the VTF shall then be allowed to drift up in temperature.

5.13 The following check list shall be completed prior top hat disassembly

5.13.1 Do all level sensors read zero level/

5.13.2 Do all pressure gauges read atmospheric level.

5.13.3 Do all temperature sensors read room temperature value.

5.14 If the answer to all 5.13 check list items is “yes” then valve GH1 may be closed and disassembly of the VTF may start.

NSLS REVISION & PERIODIC REVIEW LOG

Document Number:	LS-M-0301
Subject:	Prototype SCU VTF Phase 1 Test Procedure

> See NSLS Quality Control Coordinator for original revision and review signatures <

REVISION TABLE

Rev	Description	Date
A	Initial Release into the Controlled Document System	04/ /05

PERIODIC REVIEW TABLE

Complete this table to record the completion of periodic reviews for an existing controlled document. A successful periodic review will reveal the existing document is current, correct, and does not require any revision/change.

Document Review Frequency
5 years

Rev	Date	Reviewed By (Print):	Signature:

BROOKHAVEN NATIONAL LABORATORY

Work Permit # _____
Work Order # _____
Job# 50004 Activity# 50004

1. Work requester fills out this section. ☐ Standing Work Permit

Requester: David Harder	Date: 8/18/05	Ext.: 4978	Dept/Div/Group: LS/Magnetic Measurements Group
Other Contact person (if different from requester): John Skaritka			Ext.: 7411
Work Control Coordinator: David Harder		Start Date: 8/29/05	Est. End Date: 10/29/05
Brief Description of Work: VTF Phase I Test			
Building: 902 annex	Room:	Equipment:	Service Provider:

2. WCC, Requester/Designee, Service Provider, and ES&H (as necessary) fill out this section or attach analysis

ES&H ANALYSIS

Radiation Concerns

☒ None ☐ Activation ☐ Airborne ☐ Contamination ☐ Radiation
☐ Other
☐ Special nuclear materials involved, notify Isotope Special Materials Group
☐ Fissionable materials involved, notify Laboratory Criticality Officer

Radiation Generating Devices: ☐ Radiography ☐ Moisture Density Gauges ☐ Soil Density Gauges ☐ X-ray Equipment

Safety Concerns

	☐ None	☐ Ergonomics	☐ Transport of Haz/Rad Material	
☐ Adding/Removing Walls or Roofs	☐ Confined Space*	☐ Explosives	☐ Lead*	☐ Penetrating Fire Walls
	☐ Corrosive	☐ Flammable	☐ Magnetic Field*	☐ Pressurized Systems
☐ Asbestos*	☒ Cryogenic	☐ Fumes/Mist/Dust*	☒ Material Handling	☐ Rigging/Critical Lift
☐ Beryllium*	☐ Electrical	☐ Heat/Cold Stress	☐ Noise*	☐ Toxic Materials*
☐ Biohazard*	☒ Elevated Work*	☐ Hydraulic	☐ Non-ionizing Radiation*	☐ Vacuum
☐ Chemicals*	☐ Excavation	☐ Lasers*	☒ Oxygen Deficiency*	☒ Other -use of cleaning solvents

* Does this work require medical clearance or surveillance from the Occupational Medicine Clinic? ☐ Yes ☒ No

Environmental Concerns

	☐ None	☐ Work impacts Environmental Permit No.	
☐ Atmospheric Discharges (rad/non-rad)	☐ Land Use Institutional Controls	☐ Soil Activation/contamination	☐ Waste-Mixed
☐ Chemical or Rad Material Storage or Use	☐ Liquid Discharges	☒ Waste-Clean	☐ Waste-Radioactive
☐ Cesspools (UIC)	☐ Oil/PCB Management	☐ Waste-Hazardous	☐ Waste-Regulated Medical
☐ High water/power consumption	☐ Spill potential	☐ Waste-Industrial	☐ Underground Duct/Piping
Waste disposition by: Magnet Division staff			☐ Other

Pollution Prevention (P2)/Waste Minimization Opportunity: ☒ No ☐ Yes

FACILITY CONCERNS ☒ None

☐ Access/Egress Limitations	☐ Electrical Noise	☐ Potential to Cause a False Alarm	☐ Vibrations
	☐ Impacts Facility Use Agreement	☐ Temperature Change	☐ Other
☐ Configuration Control	☐ Maintenance Work on Ventilation Systems	☐ Utility Interruptions	

WORK CONTROLS

Work Practices

☐ None	☐ Exhaust Ventilation	☐ Lockout/Tagout	☐ Spill Containment	☐ Security (see Instruction Sheet)
☐ Back-up Person/Watch	☐ HP Coverage	☐ Posting/Warning Signs	☐ Time Limitation	☐ Other
☒ Barricades	☐ IH Survey	☒ Scaffolding-requires inspection	☐ Warning Alarm (i.e. "high level")	

Personal Protective Equipment

☒ None	☐ Ear Plugs	☐ Gloves	☐ Lab Coat	☐ Safety Glasses	
☐ Coveralls	☐ Ear Muffs	☐ Goggles	☐ Respirator	☐ Safety Harness	
☐ Disposable Clothing	☐ Face Shield	☐ Hard Hat	☐ Shoe Covers	☐ Safety Shoes	☐ Other

Permits Required (Permits must be valid when job is scheduled.)

☐ None	☐ Cutting/Welding	☐ Impair Fire Protection Systems
☐ Concrete/Masonry Penetration	☐ Digging/Core Drilling	☐ Rad Work Permit-RWP No
☐ Confined Space Entry	☐ Electrical Working Hot	☒ Other --work permit #241, for scafflold related work on the VTF assembly

Dosimetry/Monitoring

☐ None	☐ Heat Stress Monitor	☐ Real Time Monitor	☐ TLD
☐ Air Effluent	☐ Noise Survey/Dosimeter	☐ Self-reading Pencil Dosimeter	☐ Waste Characterization
☐ Ground Water	☐ O_2/Combustible Gas	☐ Self-reading Digital Dosimeter	☐ Other
☐ Liquid Effluent	☐ Passive Vapor Monitor	☐ Sorbent Tube/Filter Pump	

Training Requirements (List specific training requirements)

Based on analysis above, the Walkdown Team determines the risk, complexity, and coordination ratings below:			If using the permit when all hazard ratings are low, only the following need to sign: (Although allowed, there is no need to use back of form)
ES&H Risk Level:	☐ Low ☐ Moderate ☐ High		WCC: Date:
Complexity Level:	☐ Low ☐ Moderate ☐ High		Service Provider: Date:
Work Coordination:	☐ Low ☐ Moderate ☐ High		Authorization to start Date:
			(Departmental Sup/WCC/Designee)

3. Both work requester and service provider contribute to work plan (use attachments for detailed plans)

Work Plan (procedures, timing, equipment, and personnel availability need to be addressed): See NSLS document LSM-0403 for detailed Work Plan.
Special Working Conditions Required:
Operational Limits Imposed:
Post Work Testing Required:

Job Safety Analysis Required: ☐ Yes ☒ No	Walkdown Required: ☒ Yes ☐ No

Reviewed by: Primary Reviewer will determine the size of the review team and the other signatures required based on hazards and job complexity. Primary Reviewer signature means that the hazards and risks that could impact ES&H have been identified and will be controlled according to BNL requirements.

Title	Name (print)	Signature	Life #	Date
Primary Reviewer				
ES&H Professional				
Other				
Other				
Work Control Coordinator				
Service Provider				
	Review Done: ☐ in series	☐ team		

4. Job site personnel fill out this section.

Note: Signature indicates personnel performing work have read and understand the hazards and permit requirements (including any attachments).			
Job Supervisor:		Contractor Supervisor:	
Workers:	Life#:	Workers :	Life#:
Workers are encouraged to provide feedback on ES&H concerns or on ideas for improved job work flow. Use feedback form or space below.			

5. Departmental Job Supervisor, Work Control Coordinator/Designee

Conditions are appropriate to start work: (Permit has been reviewed, work controls are in place and site is ready for job.)			
Name:	Signature:	Life#:	Date:

6. Departmental Job Supervisor, Work Requester/Designee determines if Post Job Review is required. ☐ Yes ☐ No

Post Job Review (Fill in names of reviewers)			
Name:	Signature:	Life#:	Date:
Name:	Signature:	Life#:	Date:

7. Worker provides feedback.

Worker Feedback (use attached sheets as necessary) a) WCM/WCC: Is any feedback required? ☐ Yes ☐ No b) Workers: Are there better methods or safer ways to perform this job in the future? ☐ Yes ☐ No

8. Closeout: Work Control Coordinator (authorizing dept.) checks quality of completed permit and ensures the work site is left in an acceptable condition. (WCC can delegate clean up of work area to work supervisor)

Name:	Signature:	Life#:	Date:
Comments:			

Instructions for filling out the work permit

Header Information
The "Work Permit#" line shall be filled in by whatever numbering sequence a given department or group wants to use. The Work Control Coordinator maintains a logbook or spreadsheet of work permit numbers issued. The other three number lines are provided for tracking purposes and are filled in as appropriate. The "Standing Work Permit" box is checked if the permit is being used as such.

Section 1 – Work Request
The work requester fills out the required information in this section. The name in the "Work Control Coordinator" line is the requester's WCC. The "Service Provider" line is the department doing the work.

Section 2 – Hazard Analysis
The work requester initially fills out this section identifying the location hazards, facility concerns, work controls, and specific training needs. The requester provides the work information to the service provider and schedules a walkdown of the job site. A Walkdown Team composed of the requester, service provider, and ES&H support personnel (*as needed*) may provide further input for Section #2. The service provider predominantly identifies the task hazards and appropriate controls.

Notes:
-For each subsection, a "NONE" or a hazard or work control box must be checked.
-The "Safety Concerns" items with an asterisk indicate work activities that may require Industrial Hygiene to investigate, and may then require OMC medical surveillance. If the workers are already on the protocol list for the activity or hazard, then OMC surveillance would not be needed and the "No" box would be checked. If not sure of the worker's medical status or the particular work activity, mark "Yes" and contact Industrial Hygiene to evaluate.
-When a job involves a significant change to the amount of chemicals or radioactive materials in a facility, the Building Manager must be notified to determine if the Facility Hazard Category has been affected as per the Facility Use Agreement.
-For guidance in determining if security concerns are applicable see "Security Checklist."
-Table 1 and 2 in the screening guidelines attachment provide additional definition to the ES&H issues.

Section 2 – Low, Moderate and High Hazard Determination
The bottom part of Section 2 is used by the WCC or Walkdown Team to make a final determination as to the rating levels (low, moderate, or high) for ES&H risk, complexity, and work coordination. A given task may be a skill of the worker job, but the complexity of the system or the work coordination involved can dictate a higher level of planning.

If the WCC or Walkdown Team decides that ES&H risk, complexity, and work coordination are all low, then the job is categorized as a low hazard and the work permit process can be terminated at this point. If a permit will be used for low hazard work, the Work Control Coordinator, the service provider (supervisor, craft, or technician), and an individual authorizing work must sign in the lower right hand corner of the front side.

If any of the ES&H risk, complexity, or work coordination rating levels are checked off as moderate or high, then the rest of the work permit form must be processed.

Section 3 – Work Plan
The work plan section is filled out predominantly by the work requester with input from the service provider and ES&H personnel as needed. The job site should be visited by the Walkdown Team. A written description shall detail the job and any precautions that need to be taken. Use attachments for detailed plans (i.e., drawings) and longer narrative if needed.

If the ES&H risk level is rated high, then a Job Safety Analysis, JSA, must be written and attached to the work permit.

Section 3 – Primary Reviewer
It is encouraged to review work permits in a team setting as opposed to circulation the permit for review and signoff in series. The team environment has proven to be more effective in achieving good ES&H reviews and in coordinating the required resources.

The Primary Reviewer is responsible for assembling ES&H and subject matter experts as needed for the review based on the ESH risks, job complexities, and overall coordination. If the Primary Reviewer is a member of the Walkdown Team, then the team signoff in the "Reviewed By" section can occur following the walkdown if desired. Following review and approval, the work permit is returned to the work requester for scheduling with the work provider.

Section 4 – Supervisor and Worker Signoffs
A pre-job briefing with the crew to review job hazards, permits, and coordination requirements. (Required for moderate and high hazards)

The supervisor and the workers sign the form (or an attachment) to indicate that they understand the hazards, the controls and the permit requirements.

Note: The workers must sign for themselves, it is not permissible for the supervisor to write their worker's names on the work permit.

Section 5 – Conditions Appropriate to Start Work
The affected department usually authorize the start of the job. Without this section, the workers could start any time without a final check with the department. The person signing this section verifies that the requirements designated on that permit *(work controls, etc.)* have been met, and that the job may proceed.

Section 6 – Post Job Review
The job supervisor or work requester determines whether a post job review is needed. In some cases, the review team may decide that a post job analysis would be beneficial for lessons learned and will request the review. If a review is requested, print the name of the reviewer(s) on the line and check off the "Yes" block. If no review is needed, check off the "No" block.

Section 7 – Worker Feedback
This section is provided for the workers to feedback comments on ES&H issues from the job or on how to improve the work efficiency. The WCM/WCC may request worker feedback by answering yes to Section 7(a); if 7(a) is marked yes, then it is up to the WCM/WCC /Supervisor to solicit (and document on the WP or attached sheet) feedback from the workers. Regardless of the answer to 7(a) workers are encouraged to answer Section 7(b).

Section 8 – Closeout
The original copy of the work permit is returned to the Work Control Coordinator who originated it initially. The Work Control Coordinator reviews the permit for consistency, signs off to close it out, and files it. The WCC provides feedback to appropriate personnel if any permit discrepancies occur.